Model: LTH3

LEGACY® TITANIUM™ HF Charger

Owner's Manual

To automatically be connected to your closest Service Center, call us toll-free at 1-800-DOUGLAS (1-800-368-4527)
Or, visit us at: http://www.douglasbattery.com/

I.B. 1577
Rev: D

Model:	S/N:	AC Input Voltage
Installed by		Date

IMPORTANT
Read and understand your user's manual before installing, operating, or servicing this product.
DO NOT DESTROY THIS BOOK

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AC LINE VOLTAGE LETTER CODES

The following table describes the code letters to be used in new charger part numbers to indicate the AC line voltage(s) and AC line frequency at which the charger can be operated.

Code Letters	Voltage(s) (volts rms)	Line Frequency (Hertz)	Comments
Y	480	50/60	480 VAC only

SPECIALTY CHARGER OPTIONS LIST

Suffix	Description
C6	6' of #10AWG AC Cord with 30 AMP Plug.
C10	10' of #10AWG AC Cord with 30 AMP Plug.
C12	12' of #10AWG AC Cord with 30 AMP Plug.
C8	8' of #10AWG AC Cord with 30 AMP Plug.
CF	10' of #8AWG AC Cord with 50 AMP Plug.
CF12	12' of #8AWG AC Cord with 50 AMP Plug.
CR	6' of #10AWG AC Cord with 30 AMP Plug and 30AMP receptacle.
L16	16' of DC cable.
L23	23' of DC cable.
L30	30' of DC cable.
NC	No DC cables (**NOT UL APPROVED)**
PP	Charger shipped on a Plastic Pallet
S	Series DC Cables

IMPORTANT SAFETY INSTRUCTIONS

1. This manual contains important safety and operating instructions. Before using the battery charger, read all instructions, **cautions**, and **warnings** on the battery charger, the battery, and the product using the battery.
2. This charger has been designed to only charge flooded, lead-acid batteries. Read and understand all setup and operating instructions before using the battery charger to prevent damage to the battery and to the charger.
3. **Do not** touch non-insulated parts of the output connector or the battery terminals to prevent electrical shock.
4. During charge, batteries produce hydrogen gas which can explode if ignited. Never smoke, use an open flame, or create sparks in the vicinity of the battery. Ventilate well when the battery is in an enclosed space.
5. **Do not** connect or disconnect the battery plug while the charger is on. Doing so will cause arcing and burning of the connector resulting in charger damage or battery explosion.
6. Lead-acid batteries contain sulfuric acid which causes burns. **Do not** get in eyes, on skin, or on clothing. In cases of contact with eyes, flush immediately with clean water for 15 minutes. Seek medical attention immediately.
7. Only factory qualified personnel can service this equipment. De-energize all AC and DC power connections before servicing the charger.
8. The charger is **not** for outdoor use.
9. Do not expose the charger to moisture. Operating **conditions** should be 0º to 104º F; 0 to 70% relative humidity.
10. Do not operate the charger if it has been dropped, received a sharp hit, or otherwise damaged in any way.
11. For continued protection and to reduce the risk of fire, install chargers on a floor of non-combustible material such as stone, brick, or grounded metal.

WARNING: The shipping pallet must be removed for proper and safe operation.

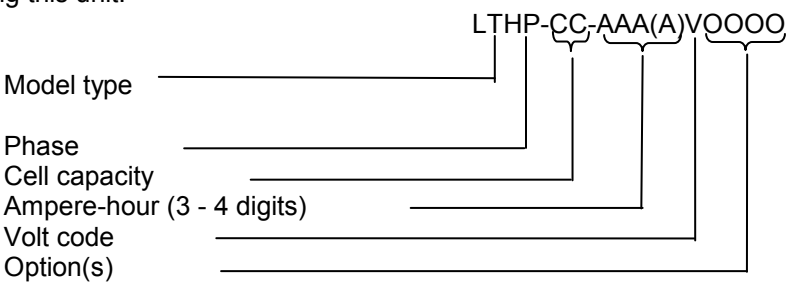
INSTRUCTIONS DE SÉCURITÉ IMPORTANTES

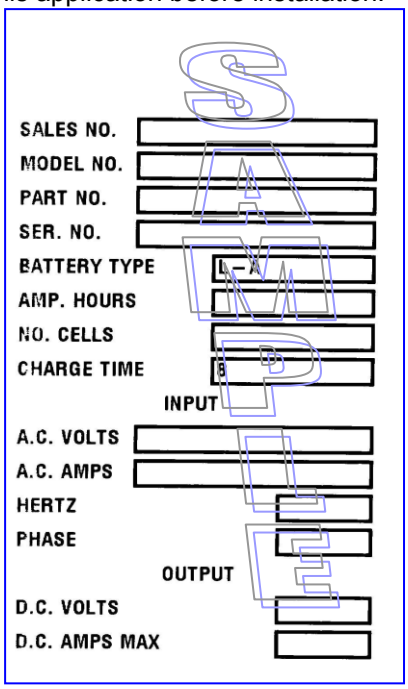
1. Ce manuel contient des informations et des consignes importantes pour l'emploi et l'utilisation du chargeur de batteries industrielles. Avant tout emploi, il est fortement conseillé de lire l'ensemble des instructions, recommandations, et avertissements concernant le chargeur et la batterie.
2. Ce chargeur a été conçu pour la charge des batteries industrielles type plomb-acide dite « ouverte ». (Il ne peut pas être adapté pour les batteries étanches.)
3. Lisez toutes les condisnes d'installation et d'utilisation avant d'employer le chargeur de batterie pour empêcher des dommages à la batterie et / ou au chargeur.
4. **Ne pas être en contact avec** les pièces sous-tension non-isolées tels que la prise de charge ou des éléments de connexion de la batterie pour empêcher le choc électrique.
5. Pendant la charge, le dégagement d'hydrogène rend l'emploi de feu strictement interdit «risque d'explosion ». Ne jamais fumer, employer une flamme nue, ou créez les étincelles à proximité de la batterie. Ventiler suffisamment pour éviter toute condensation de gaz dans un espace restreint.
6. **Ne brancher ou débrancher la batterie que si le chargeur est à l'arrêt.** Faire ainsi risque d'endommager la prise de charge pouvant avoir pour conséquence des dommages du chargeur ou l'explosion de la batterie.
7. Les batteries d'acide au plomb contiennent l'acide sulfurique, qui cause des brûlures. Eviter le contact avec les yeux, la peau, ou sur l'habillement. Dans le cas de contact avec les yeux, et faut nettoyer immédiatement avec de l'eau propre pendant 15 minutes et consulter un médecin immédiatement.
8. Seul le personnel qualifié par l'usine peut entretenir cet équipement. Pour le service, veuillez contacter la société Douglas ou l'un de ces représentant (1-800-DOUGLAS) (1-800-368-4527)
9. Avant toute intervention d'entretien ou de réparation il faut s'assurer que le chargeur est hors tension et la batterie est déconnectée.
10. Le chargeur **n'est** pas pour un usage extérieur.
11. Ne pas exposer le chargeur à l'humidité. Les conditions de fonctionnement devraient être – 15° à 40°c; humidité relative de 0 à de 70%.
12. Ne pas mettre en fonctionnement le chargeur s'il a reçu un choc mécanique ou tout autre dommage di quel que façon.
13. Pour une protection permanente et pour réduire le risque du feu, installez les chargeurs sur un plancher ou un matériel non-combustible tel qu'un mur plein en béton, en brique, ou l'acier.

TECHNICAL INFORMATION

The nameplate, located on the outside of the charger, should be used to check this application before installation.

Part Number
This number specifies in general the characteristics of this particular charger and for this reason it is required in any discussion or correspondence regarding this unit.





Serial Number
This number indicates complete information about the specific charger. It must be supplied with the part number on any correspondence or discussion regarding this charger.

Battery Type
The chemical content construction of the battery this unit is designed to charge is given in this part of the nameplate. (L-A = Flooded Lead-Acid)

Ampere-Hours
The information supplied here is the ampere-hour battery capacity which this unit has been factory adjusted to charge. Charging batteries of ampere-hour capacities not specified here might cause the charger to deviate from the specifications.

Cells
This portion of the nameplate gives the number of cells this unit will charge. **This number must match exactly with any battery connected to the charger output.**

Input AC Volts
The nameplate shows the input voltage accommodated by this charger.
IMPORTANT: The charger will operate only on nominal line voltages stamped on the nameplate.
Failure to select the correct voltage will result in damage to the charger and/or the battery.

Input AC Amps
The external fusing and/or the line disconnect circuit breaker should be as specified in the National Electrical Code or other local code agencies. (AC fuse values can be found on the decal inside the charger.)

Hz
This gives the frequency in cycles per second of the AC input voltage. Under no conditions operate charger at a different frequency or from a generator with unstable frequency.

Phase
Number "3" indicates a Three Phase Charger.

DC Volts
This gives the nominal DC output voltage of the system.

Rated DC Amps
This is the nominal DC value of current that this unit will deliver to a battery that is 100% discharged.

INSTALLATION

WARNING: The shipping pallet must be removed for proper and safe operation.

Location

For maximum trouble-free service, choose a location which is free of excess moisture, dust, and corrosive fumes. Also, avoid locations where temperatures are high or where liquids will drip on the charger. Allow six (6) inches of clearance at rear and sides of the charger for air circulation. Do not obstruct the ventilating openings or the space under the charger.

Stacking Multiple Chargers

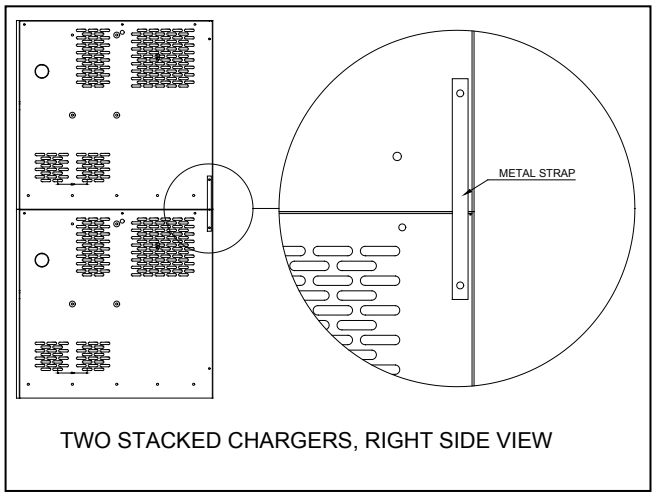
These chargers can be stacked up to a maximum of 3 units high. Chargers are not designed to be stacked side by side due to ventilation requirements.

1. Position the first charger so that a minimum of 6 inches of space is between the charger and any wall, and 12 inches between the charger and any other chargers or equipment.
2. Place the second charger on top of the first. Align the bolt holes on each charger.
3. Fasten both charger cabinets together securely using 3/8" bolts and nuts.

NOTE: the two bolts toward the back of the charger may be omitted if an after market metal strap (about 8 inches) is used to secure both chargers. Remove existing 1/4" screws of the chargers' sides and attach strap with screws. Refer to picture.
Hardware kit # X225-99-0-2 can be ordered to attach two chargers.

4. Repeat steps 2 and 3 for the third charger.
5. Stacked chargers must be fastened to the wall using devices suitable for the wall construction and the bolt holes at the top of the highest charger.

NOTE: Ambient temperature at all levels cannot exceed 104°F / 40°C



TWO STACKED CHARGERS, RIGHT SIDE VIEW

Electrical Connections

To prevent failure of the charger, be sure it is connected to the correct line voltage.

On three phase units

Connect all the charger as follows:
Phase A to L1 (fuse block)
Phase B to L2 (fuse block)
Phase C to L3 (fuse block)

Connecting Input Power

WARNING: Make sure the power to the charger is OFF and the battery is disconnected before connecting the input power to the terminals of the charger.

Connect the input power to the appropriate terminals, ***including ground***. Follow your local electrical or National Electric Code in making these connections.

AC Connection

The user must provide suitable branch circuit protection and a disconnect method from the AC power supply to the charger to allow for safe servicing.

Plug Polarity

The charging cable is connected to the DC output of the charger with the positive lead marked RED. The output polarity of the charger must be strictly observed when connecting to the battery (read warning above).
Improper connection will open the DC fuse.

Grounding the Charger

DANGER: FAILURE TO GROUND THE CHARGER COULD LEAD TO FATAL ELECTRIC SHOCK. Follow National Electric Code for ground wire sizing.

Connect a grounding conductor to the lug provided on the horizontal support panel. This lug is marked as shown:

DESCRIPTION OF OPERATION

General

Legacy® Titanium™ HF chargers are microprocessor-controlled. The processor calculates the battery's capacity so that the charging profile can be automatically adapted to the battery's actual state over a wide range of capacities. The charging coefficient is maintained absolutely on all types of batteries. Legacy® Titanium™ HF chargers adapt to the battery's capacity and its discharge level. As a result of our patented charging methodology, our chargers lower energy costs, and extend battery life.

Legacy® Titanium™ HF chargers can easily be set to charge batteries used in cold or freezer storage applications.

This battery charger is designed to charge flooded lead-acid storage batteries within the range of the cell and ampere-hour rating as marked on the nameplate.

Beginning the Charge

When a battery is connected to the charger, the control board senses voltage and after a 1 minute delay, the charger energizes.

Charging

Charging current is determined by the battery voltage and interaction of the charger. Charging current declines automatically as battery voltage rises during the charge. As the battery charges, the LED display will output various charge parameters including the percentage of battery capacity.

AC Power Fail

If the AC power fails with a battery connected to the charger during a charge cycle, the charger will reset and start a new charge cycle when power is restored.

Series Charging

In series charging, the voltages of both batteries add up and must match charger's nameplate rating. Charger's Ampere-Hour rating must be equal to each of the batteries Ampere-Hour rating. Charge cycle will not start unless both batteries are connected.

GLOSSARY

Charging Coefficient
The ratio of the number of ampere-hours restored during charging to the number of ampere-hours consumed during discharge.

Charging Profile
The charging profile defines the rate of current charge over time. The charger adapts to the battery's age and level of discharge. Controlling the overcharge coefficient, whatever the battery's discharge level, reduces the amount of electricity consumed.

Cold Storage
This allows configuration of the charger for use with batteries in cold storage application. The profile is an IEI (constant current, constant voltage, constant current) type with a number of user configurable parameters.

Equalization Charging
Equalization charging, performed after normal charging, balances the electrolyte densities in the battery's cells.

IGBT
The IGBT controls the charger output by rapidly switching the transformer primary at 20 to 30 kHz.

Ionic Profile
This is also called "ionic mixing". This type of charging profile consists of sending short pulses of current to stimulate gas formation in the active material, causing sulphuric acid to be distributed outside the plates. This system of mixing the electrolyte enables more rapid charging of flooded cell batteries subject to very high demands and balances out differences in density, homogenizing the electrolyte across the surface of the plates.

Power Diodes
The power diodes rectify the AC input and the output of the transformer.

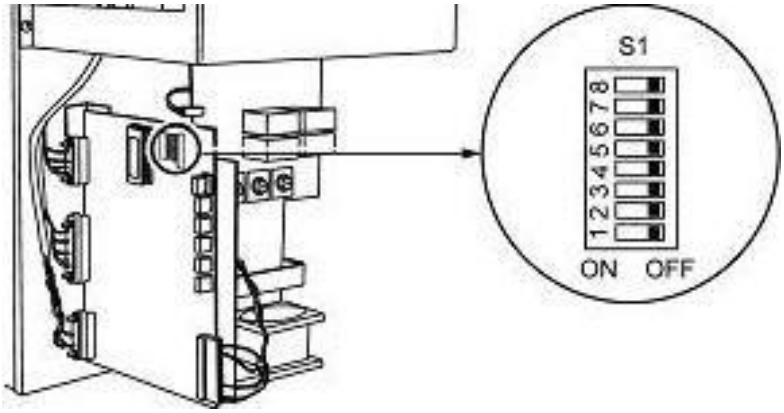
Refresh Charging
Refresh or maintenance charging enables the battery to be maintained at maximum charge all the time that it is connected to the charger.

OPERATING INSTRUCTIONS

CONTROL BOARD

Charger Configuration and Setup
The Legacy® Titanium™ HF charger can be configured for many modes of operation to deal with the many possible battery charging requirements found in the field. Please see the sections "Factory Configuration" and "Changing Configuration" for details on how to configure the charger for your individual needs.

Individual charger configurations can be further refined to match specific battery conditions by changing any of the available programmable settings. Please see the sections "Factory Settings" and "Changing Settings" for details on how to set the charge parameters to optimize battery charging.



Configuration switches location and detail.

Factory Configuration
As delivered, the charger configuration is set with all eight (8) positions of the DIP Switch in the **OFF** position. This sets the charger as follows:

#1 OFF – Sets charger for Ionic Charge Profile
#2 OFF – Inhibits Refresh Charges
#3 & 4 OFF – Selects 9 foot (3M) battery cables
#5 & 6 OFF – Has no effect on an Ionic Charge Profile
#7 OFF – Limits Equalize Charge period to 3 hours
#8 OFF – Inhibits Auto-Equalization

Changing Configuration

The charger configuration can be modified by changing the state (OFF or ON) of the eight (8) DIP Switch positions as follows:

Charge Profile

SW #	OFF	ON
1	Ionic	Cold Storage

Refresh Charges

SW #	OFF	ON
2	Disable	Enable

Battery Cable Length

Length	SW #3	SW #4
9' (3M)	OFF	OFF
16' (5M)	OFF	ON
23' (7M)	ON	OFF
30' (9M)	ON	ON

Battery Temperature (Cold Storage Profile, only)

Temp (°F) *	Vgas	SW #5	SW #6
46 & lower	2.460	OFF	OFF
47 to 56	2.430	OFF	ON
57 to 66	2.410	ON	OFF
67 & higher	2.390	ON	ON

* If SW #1 is OFF, Vgas is 2.370 regardless of the settings of SW #5 & #6.

Equalization Period

SW #	OFF	ON
7	3 hours	7 hours

Auto-Equalization

SW #	OFF	ON
8	Equalize every 5 cycles	Equalize every cycle

Factory Settings

As delivered, the charger is set to operate as follows,

0 hours	Delayed Start Time
0 hours	Cool down Time
Capacity	Rated Ampere-Hour for the model
115%	Charge Coefficient

Changing Settings

Charger settings are modified with the Equalize Pushbutton (Equal PB) as follows,

A. Selecting Delayed Start Time

1. With no battery connected and displaying "Connect Battery",
2. Press and hold the Equal PB until displaying "Select Start Delay"
3. Release the Equal PB, then press & release it until the desired time is displayed
4. Leave the Equal PB alone, the display will return to "Connect Battery".

Note: 0, 1, 4 & 8 hours are the available delay times in step #A3.

B. Selecting Cool down Time

1. With no battery connected and displaying "Connect Battery",
2. Press and hold the Equal PB until displaying "Select Cool down"
3. Release the Equal PB, then press & release it until the desired time is displayed
4. Leave the Equal PB alone, the display will return to "Connect Battery".

Note: 0, 1, 2, 4, 6 & 8 hours are the available cool down times in step #B3.

Setting the following parameters is only allowed when the charger is configured for cold storage.

C. Selecting Battery Capacity (Cold Storage Profile, only)

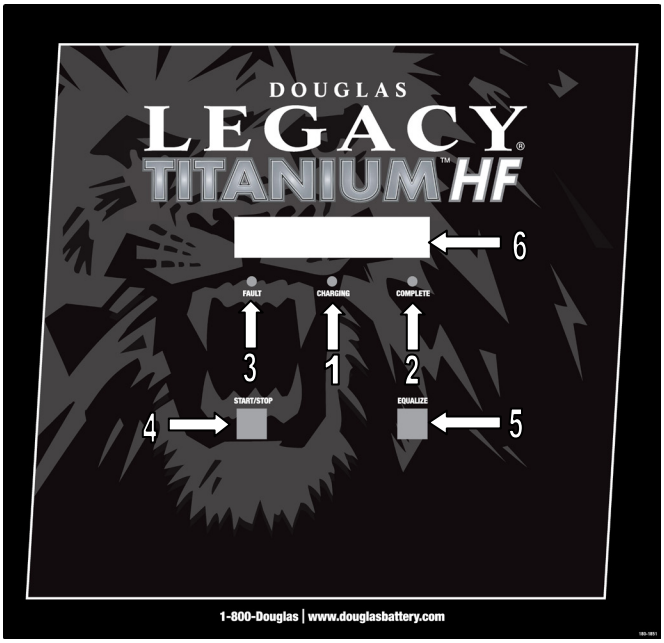
1. With no battery connected and displaying "Connect Battery",
2. Press and hold the Equal PB until displaying "Select Capacity"
3. Release the Equal PB, then press & release it until the desired AH is displayed
4. Leave the Equal PB alone, the display will return to "Connect Battery".

Note: 450 thru 1600 Amp-Hours (1500 AH for 48V), in 50 AH increments, is available in step #C3.

D. Selecting Charging Coefficient (Cold Storage Profile, only)

1. With no battery connected and displaying "Connect Battery",
2. Press and hold the Equal PB until displaying "Select Coefficient"
3. Release the Equal PB, then press & release it until the desired factor is displayed
4. Leave the Equal PB alone, the display will return to "Connect Battery".

Note: 1.10, 1.12, 1.15, 1.18 (110% to 118%) is available in step #D3.



CHARGER CONTROL PANEL

Ref.	Function
1.	Yellow "Charging in progress" light.
2.	Green "Complete" light (battery charged).
3.	Red "Fault" light.
4.	Start/ Stop pushbutton switch.
5.	Equalization button.
6.	Display

CHARGING

Introduction

This range of chargers can recharge 24V, 36V, and 48V batteries, depending on the version ordered. The microprocessor control automatically recognizes the battery's capacity, state of charge, etc., providing optimum battery control from a highly efficient analysis of its condition.
Equalization and refresh or maintenance charging cycles are available.

Normal Charging

Make sure that the charger is properly matched for the particular battery. For charger characteristics refer to the nameplate label located on the front panel of the charger. Failure to properly match charger and battery can result in damage to both.

Delayed Start

If this has been programmed, charging starts after the programmed delay. Charging then proceeds as indicated in "Initiating charging", below.
***Note: Delayed start can be terminated and charging starts immediately by pressing the Equalize pushbutton*.**

Initiating charging

Should any message appear that does not correspond to the sequence below, please refer to "Messages during charging".

1. With the charger idle indicating "CONNECT BATTERY", connect the battery.
2. The display will alternate between "IONIC CHARGE PROFILE" and "TIME REMAIN = XXS".
3. Charging is initiated after approximately one minute.
   If delayed charging has been programmed, the Charging is delayed by the programmed time.
   After start-up, the charger measures and displays the current, the ampere-hours returned, the charge time, the voltage and the percentage of charge.
4. The "CHARGING" light goes out, the "COMPLETE" light illuminates.
   If the battery remains connected, refresh or maintenance charging is automatically initiated to retain the battery's charge.
5. If switch No. 7 ("Equalization charging") is switched to "ON", the equalization cycle is automatically initiated. Otherwise, the equalization cycle can be initiated manually. Please refer to "Equalization charging".
6. When the "COMPLETE" light illuminates, disconnect the battery, which is now ready for use.

CAUTION: To prevent arcing and burning at the connector and possible battery explosion, press the **START/STOP** push button first to stop the charge cycle before disconnecting a battery that is currently on charge.

Equalization Charging

The charger will automatically initiate an equalize cycle every 5 complete charges. Also, an equalization cycle can be initiated manually, or can be programmed to automatically initiate.

Desulphation Charging

If the battery is of flooded cell lead/acid type and severely discharged, below 1.95V per cell, a desulphation cycle is initiated automatically before the normal charging process.

Equalize Manual Initiation

1. Once the "COMPLETE" light illuminates at the end of a normal charge, press the "EQUALIZE" pushbutton.
2. The "COMPLETE" light will extinguish and the "CHARGING" light will illuminate.
3. When Equalization is finished, the "CHARGING" light will extinguish and the "COMPLETE" light will once again illuminate. The battery is ready for use.

Equalize Automatic Initiation

1. Set dip switch #8 to "ON".
2. When normal charging is complete, an equalization cycle is initiated automatically. When the green "COMPLETE" light illuminates, the battery is ready for use.

Refresh Charging

Once charging is complete, as long as the battery remains connected, refresh charging is automatically initiated to retain the battery's charge. In this mode, the charger will run every 6 minutes for approximately 10 seconds, until the battery is disconnected. Operation is controlled by switch #2.

End of Charge Data Storage

The Legacy® Titanium™ HF has the ability to store the last 20 charge cycles. The information shown in the final display rotation will be stored for each of the 20 cycles. The 21st cycle will cause the oldest (first) cycle to be erased. To retrieve data, push and hold the equalize button for about 5 seconds while the charger is in "Idle" mode ("CONNECT BATTERY" is displayed) until "Display Data Log" is shown. Release the equalize button and "XX STORED PROFILES" is displayed, "XX" is a number which represents the total number of memorizations stored. Push and release the equalize button to scroll through the stored parameters for each of the profiles stored. After the last profile (the most recent) the display will return to idle mode.
The parameters stored in the memorizations are:

STORED PROFILE #XX:	XX = the number of the profile (#1 is the most recent charge cycle).
EOC CURRENT:	Battery current at the end of charge in Amps.
BATTERY VpC:	Cell Voltage at the end of charge in Volts.
AH RETURNED:	Ampere-hours recharged.
SOC CHARGE:	Initial state of charge in percent. If the charge cycle was interrupted, this value may not be accurate.
CHARGE TIME:	Charging time in minutes.
STATUS:	"BATTERY FINISHED" or "BATTERY NOT FINISHED"

Messages during Charging
While the battery is charging, one or more of the following messages may be displayed:

"DC VOLTAGE = XX.XX"	Total Battery voltage in DC Volts
"CELL VOLTS = X.XXX"	Battery voltage expressed as Volts-per-Cell
"DC CURRENT = XXX.X"	Charging Current in DC Amps
"CHRG RET'D = XXXX"	Charge Returned to battery in Ampere-Hours
"CHARGE TIME = XX M"	Charge Time in Minutes
"CHARGE TIME = XX H"	Charge Time in Hours
"BATTERY CHG = XXX%"	Battery State-of-Charge as percent of full capacity

Messages for Faults

Fault	Line 1 Message	Line 2 Message	Fault LED	Charge Cycle	Comments
1	"AC INPUT FAULT"	"LOST REG 3 TIMES"	ON	TERMINATED	Current Regulation failed 3 times, may be due to AC service too high/low or loss of phase*
2	"DC OUTPUT FAULT"	"DC FUSE IS OPEN"	ON	TERMINATED	DC fuse has likely blown
3	"BATTERY SIZE FAULT"	"CELL-SIZE MISMATCH"	ON	TERMINATED	Based on battery voltage, battery cell size does not match charger cell-size
4	"BATTERY CAP FAULT"	"AMP-HOUR MISMATCH"	ON	TERMINATED	Diagnostic routines could not determine battery capacity
5	"TEMPERATURE FAULT"	"OVERHEATED 3 TIMES"	ON	TERMINATED	Charger power stage overheated 3 times, charging permanently stopped**
6	"PH2 TIME FAULT"	"TAPER TIME > 5 HRS"	ON	TERMINATED	Taper time exceeded the 5 hour time limit, only applies to Cold Storage Mode
7	"PH2 CURRENT FAULT"	"ERATIC CURRENT"	ON	TERMINATED	Current mode did not behave as expected during taper, only applies to Cold Storage Mode
Condition					
A	"CURRENT INTERRUPT"	"LOST REGULATION"	OFF	SUSPENDED	Current fell out of regulation, charging suspended to try regaining regulation (3x= Fault 1)
B	"THERMAL INTERRUPT"	"CHARGER OVERHEATED"	OFF	SUSPENDED	Charger power stage overheated, charging suspended to allow cool down (3x=Fault 5)**
C	"OVERLY DISCHARGED"	N/A	OFF	N/A	Battery condition announced for information only***

* "CURRENT INTERRUPT" – 1st failure tries to restart in 5 minutes, 2nd tries to restart in 2 ½ minutes, 3rd failure goes immediately to "AC INPUT FAULT"
** "THERMAL INTERRUPT" – Trip/reset (i.e. hysteresis) is thermal-switch dependent, recovery time (i.e. cool down) is environmentally dependent, 3rd trip results in "TEMPERATURE FAULT"
*** "OVERLY DISCHARGED – No longer a 'Non-fatal fault', it is only a "battery condition" that is noted on the display as the battery is charging

All "Faults" (1 thru 7) are "fatal"; the charge in process is stopped and the fault LED is lit

All "Conditions" (A thru B) are "non-fatal), however A & B temporarily suspend charging in an attempt to clear the problem

Other Messages

The following messages may appear as indicated:

"CHARGE INTERRUPTED"	Charging interrupted by pressing the "START/STOP" pushbutton*
"REFRESH CHARGE"	Refresh charge applied to battery after charge "COMPLETE"
"EQUAL CHRG PROFILE"	Equalize charge being applied to battery
"IONIC CHRG PROFILE"	A variable charge, based on charger's analytical program
"COLD CHRG PROFILE"	An I-E-I charge, based on charger's parameter settings
"TIME REMAIN = XX H"	Countdown timer, time-to-wait, 1 hour and up
"TIME REMAIN = XX M"	Countdown timer, time-to-wait, 1 to 59 minutes
"TIME REMAIN = XX S"	Countdown timer, time-to-wait, 1 to 59 seconds

*This message may remain for one minute into the charge cycle unless the battery is disconnected, and reconnected to clear the message.

A "Fuel Gauge" will appear on the second line of the LCD display after the Battery Analysis phase is complete; approximately 15 to 20 minutes into charge cycle. This is a graphical representation of the State-of-Charge of the battery determined by the charger programming.

Other messages may appear that are self explanatory (i.e. "CHARGER IDLE", "CHARGING BATTERY", etc.

MAINTENANCE & SERVICE

The charger requires a minimum of maintenance. Connections and terminals should be kept clean and tight. The unit (especially the heatsink) should be periodically cleaned with an air hose to prevent any excessive dirt build up on components. Care should be taken not to bump or move any adjustments during cleaning. Make sure that both the AC lines and the battery are disconnected before cleaning. The frequency of this type of maintenance depends on the environment in which this unit is installed.

For service, contact the closest Service Center at:

1-800-DOUGLAS (1-800-368-4527)
Or, visit us at: http://www.douglasbattery.com/

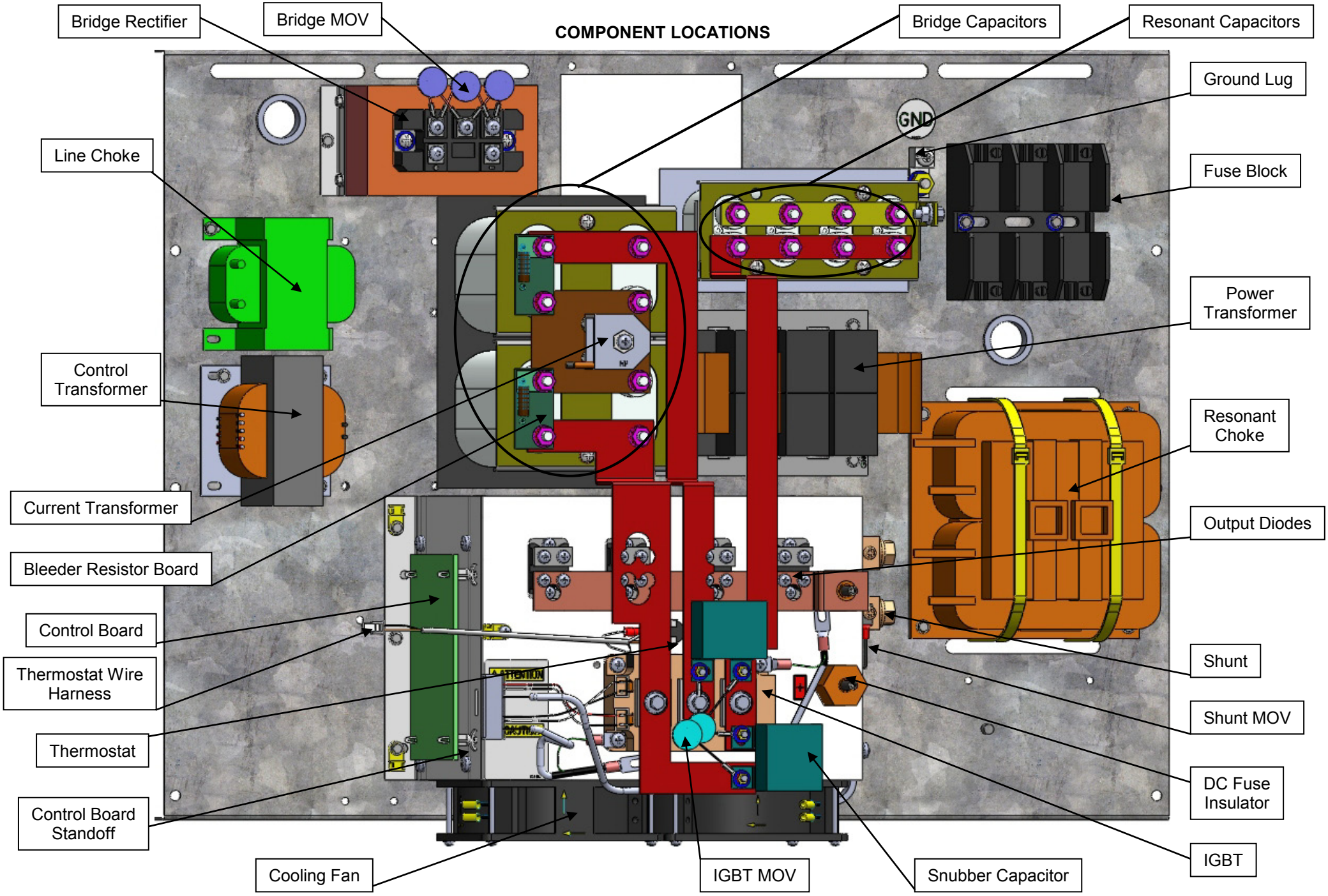
REPLACEMENT PARTS AND QUANTITY

Part Number	Description	LTH3-12-900Y	LTH3-12-1200Y	LTH3-12-1600Y	LTH3-18-1200Y	LTH3-18-1600Y	LTH3-24-1000Y	LTH3-24-1500Y	LTH3-40-625Y
X1060-06-WHFD-1	Display Board	1							
X1060-DT24-145	Control Board	1							
X1060-DT24-200	Control Board		1						
X1060-DT24-260	Control Board			1					
X1060-DT36-200	Control Board				1				
X1060-DT36-260	Control Board					1			
X1060-DT48-160	Control Board						1		
X1060-DT48-240	Control Board							1	
X1060-DT80-100	Control Board								1
X127-99-7	Control Transformer	1	1	1	1	1	1	1	1
X1106-99-PT3	Control Transformer Wires – 2 Fans	1	1		1				
X1106-99-PT4	Control Transformer Wires – 3 Fans			1		1	1	1	1
X127-6L10644	Power Transformer	1	1	1	1	1	1	1	
X127-6L10643	Power Transformer								1
X014-99-10	10A AC Fuse	3							
X014-99-20	20A AC Fuse		3		3		3		3
X014-99-30	30A AC Fuse			3		3		3	
X014-33-3	160A DC Fuse	1							1
X014-6L10466	315A DC Fuse		1	1	1	1	1	1	
X117-6L10326	250A Shunt	1	1		1		1		1
X117-6LA18620	300A Shunt			1		1		1	
R507-6LA14008	Output Diode	4	4	4	4	4	4	4	4
R507-6L14022	Bridge Rectifier	1	1	1	1	1	1	1	1
X020-6L10310	Line Choke	1	1		1		1		1
X020-6L18616	Line Choke			1		1		1	
X020-6L10353	Resonant Choke	1	1		1				1
X020-6LA18621	Resonant Choke			1		1		1	
X020-6LA10334	Resonant Choke						1		
X225-08-2	IGBT Kit			1		1		1	
X225-08-3	IGBT Kit	1	1		1		1		1
029-6LA13170	Snubber Capacitor	2	2						
029-101	Snubber Capacitor			2	2	2	2	2	2
X020-6LA18624	Output Choke								1
029-6L13006	Resonant Capacitor 1	1	1						
029-6LA13001	Resonant Capacitor 1			2	2	2	2	2	2
029-6L13099	Resonant Capacitor 2	1	1		1		1		1
029-6LA13000	Resonant Capacitor 2			1		1		1	
029-6L13104	Bridge Capacitor	2	2	4	4	4	4	4	4

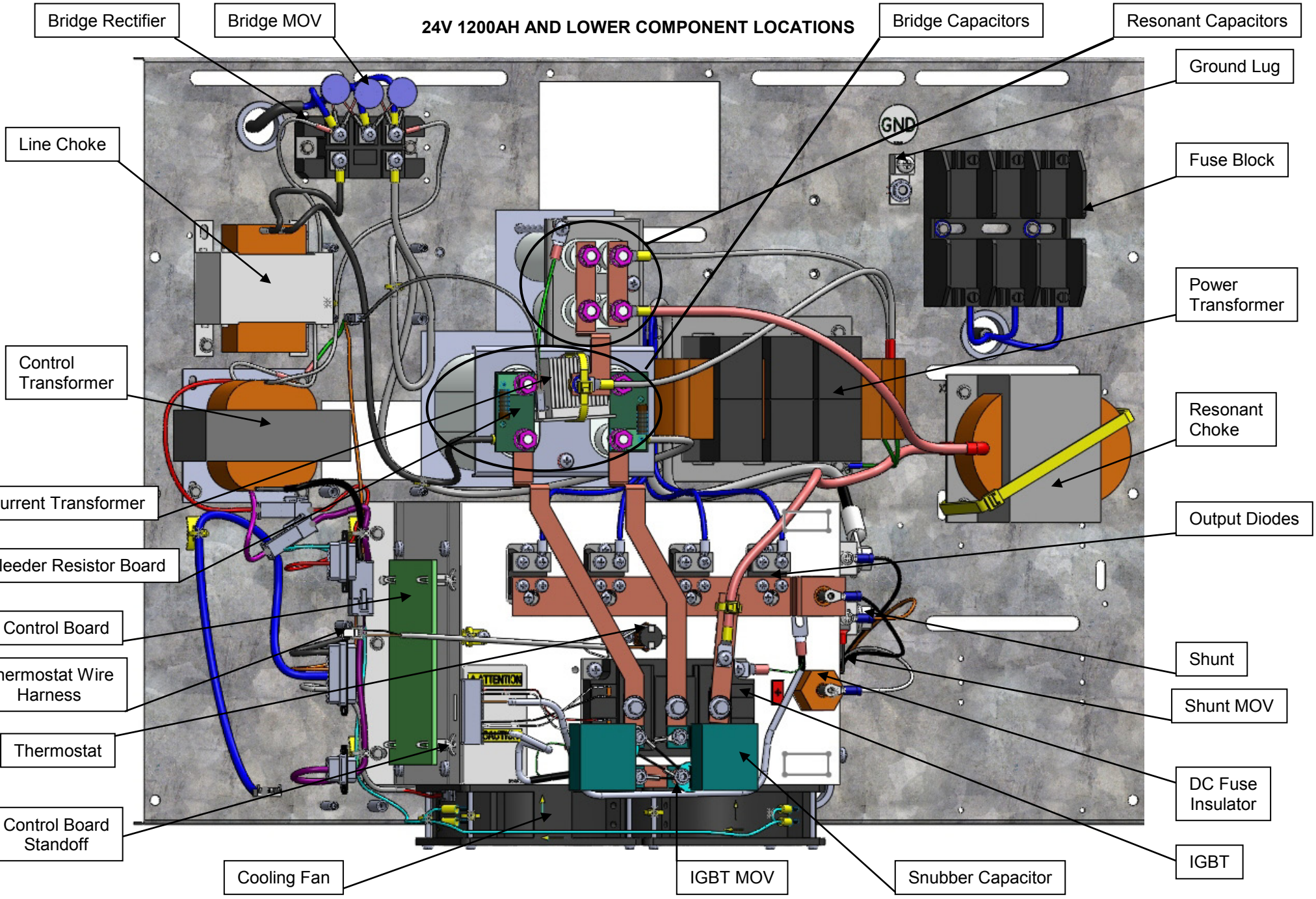
REPLACEMENT PARTS AND QUANTITY

Part Number	Description	LTH3-12-900Y	LTH3-12-1200Y	LTH3-12-1600Y	LTH3-18-1200Y	LTH3-18-1600Y	LTH3-24-1000Y	LTH3-24-1500Y	LTH3-40-625Y
X020-6L-3	AC Power Line Filter	1	1	1	1	1	1	1	1
X026-6L10934	Control Board Standoff	4	4	4	4	4	4	4	4
X1106-99-PT22	Current Transformer	1	1	1	1	1	1	1	1
438-326-2	Cooling Fan	2	2	3	2	3	3	3	3
X002-6L10721	85 Degree Thermostat	1	1	1	1	1	1	1	1
126-99-PT19	Thermostat Wire Harness	1	1	1	1	1	1	1	1
X015-50-2	Fuse Block	1	1	1	1	1	1	1	1
X1106-99-3-7	Shunt MOV Assembly	1	1	1	1	1	1	1	1
X1106-99-3-8	IGBT MOV Assembly	2	2	2	2	2	2	2	2
X1106-99-3-9	Bridge MOV Assembly	1	1	1	1	1	1	1	1
006-201-11A	DC Fuse Insulator	2	2	2	2	2	2	2	2
033-406-30	Socket Set Screw for Insulated Standoff	2	2	2	2	2	2	2	2
X1060-06-HFR-1	Bleeder Resistor Board	2	2	2	2	2	2	2	2
X012-7-24	Ground Lug	1	1	1	1	1	1	1	1

COMPONENT LOCATIONS



24V 1200AH AND LOWER COMPONENT LOCATIONS



OUTPUT CABLE REPLACEMENT

Charger Cable Size

Charger AH Rating	Standard Cable Gauge
625	#2
900	1/0
1000	1/0
1200	2/0
1500	3/0
1600	4/0

NOTE: Cable Kits do not include the connector housing, only the contact.
These standard kits are nine feet (9') long.

Replacement Cable Kits

Cable Gauge	Kit for SB175 Connector	Kit for SB 350 Connector
#2	X225-#2-175	X225-#2-350
1/0	X225-1/0-175	X225-1/0-350
2/0	N/A	X225-2/0-350
3/0	N/A	X225-3/0-350
4/0	N/A	X225-4/0-350

Connector Housing Part Numbers

CONNECTOR PART NUMBER	DESCRIPTION	CABLE SIZE	CONNECTOR PART NUMBER	DESCRIPTION	CABLE SIZE
5804	EC	#2 – 2/0	6340	SBX350 GRAY	#2 – 4/0
6316	SB3	#2 – 1/0	6341	SBX350 BLUE	#2 – 4/0
6320	SB350 GRAY	#2 – 4/0	6342	SBX350 RED	#2 – 4/0
6321	SB350 BLUE	#2 – 4/0	6343	SBX350 GREEN	#2 – 4/0
6322	SB350 RED	#2 – 4/0	6359	SBX350 BLACK	#2 – 4/0
6323	SB350 YELLOW	#2 – 4/0	6360	SBX350 YELLOW	#2 – 4/0
6324	SB350 GREEN	#2 – 4/0	7205	YC	#2 – 3/0

When ordering replacement cables:

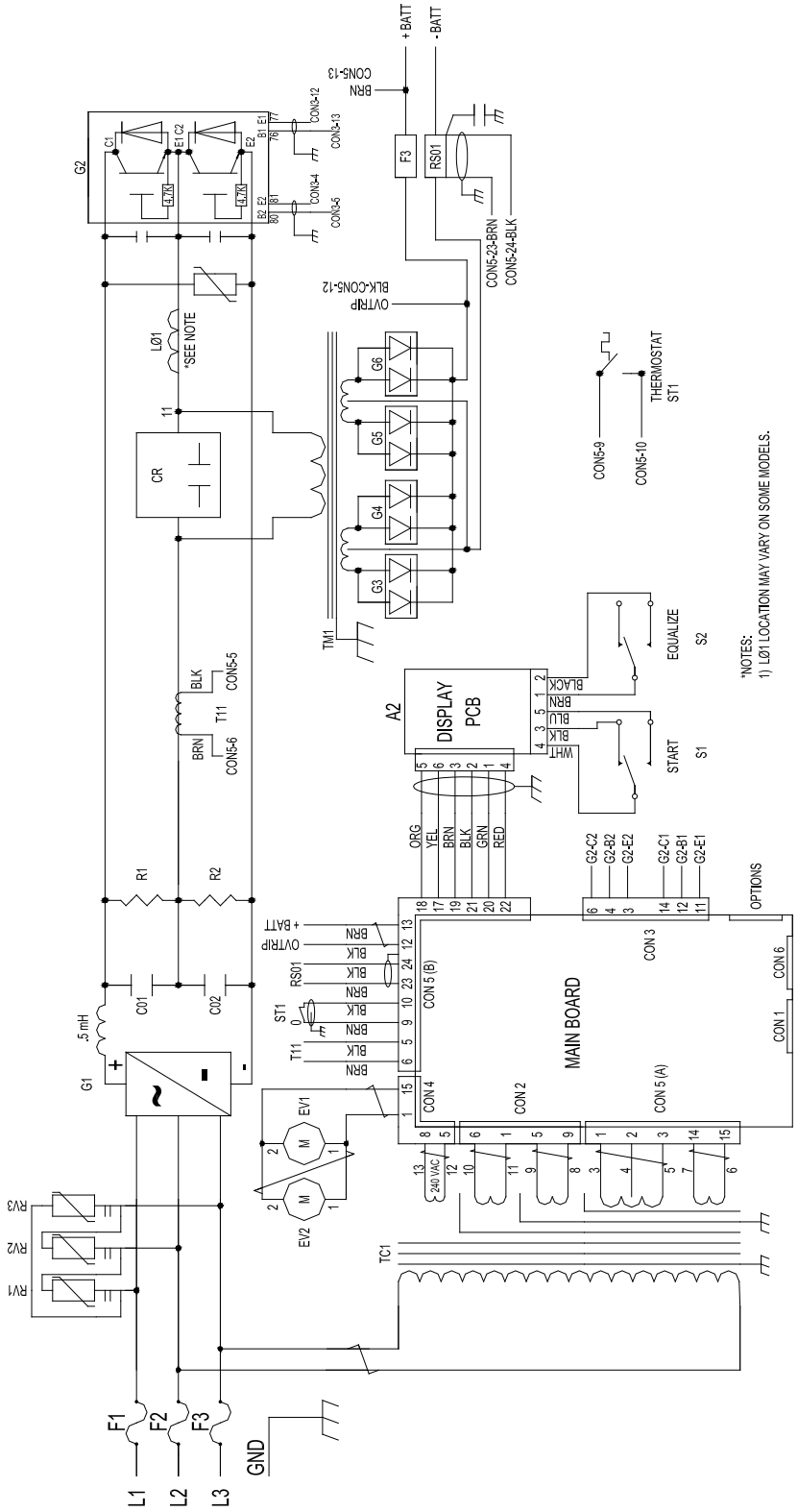
1. Determine cable size and length: L13; L15; L18; L20; L25; L30
2. Determine connector housing part number.

Example:
For a charger requiring twenty feet (20') of 2/0AWG (gauge) cables and a SB350 RED connector, the <u>two</u> part numbers to order are:

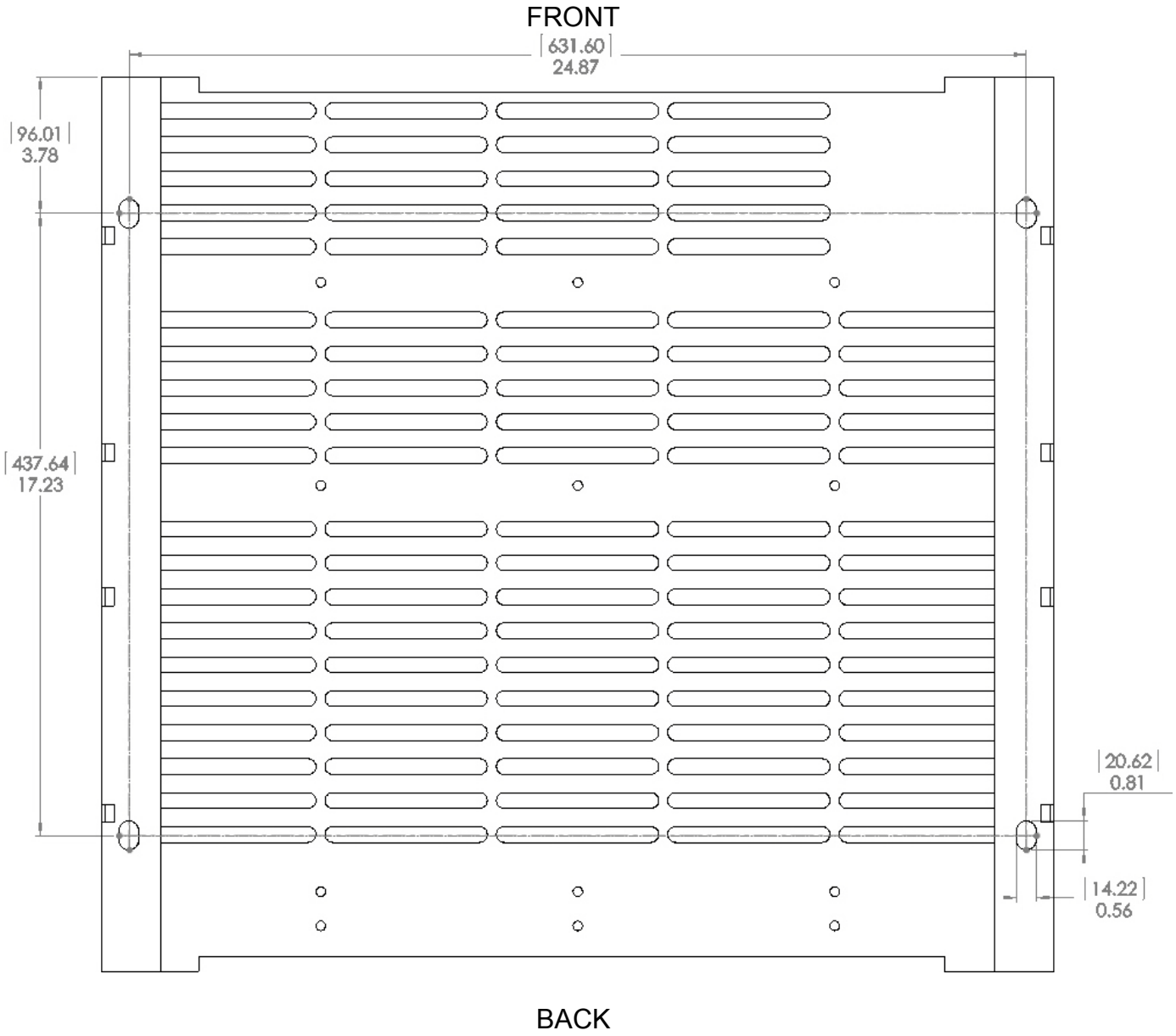
1. X225-2/0-350-L20
2. 6322

SCHEMATIC

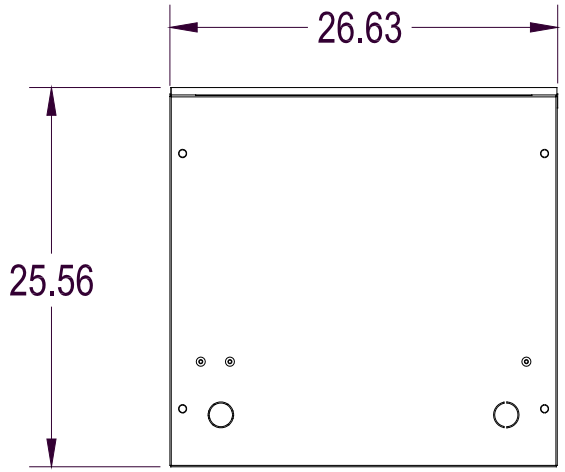
Schematic, 3 Phase, VOLTAGE Y

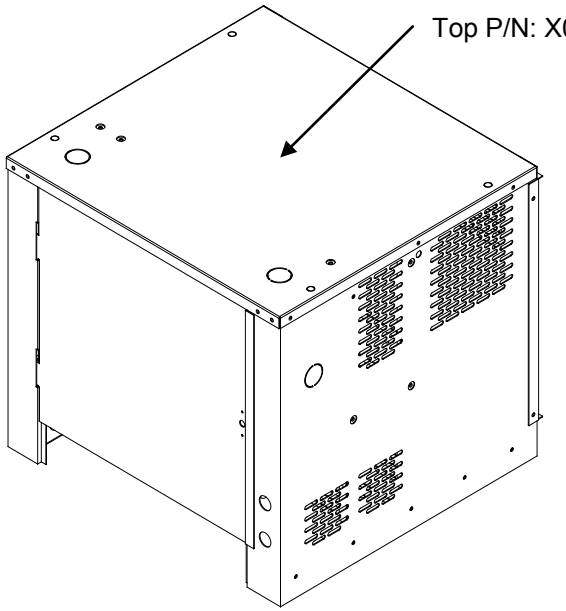


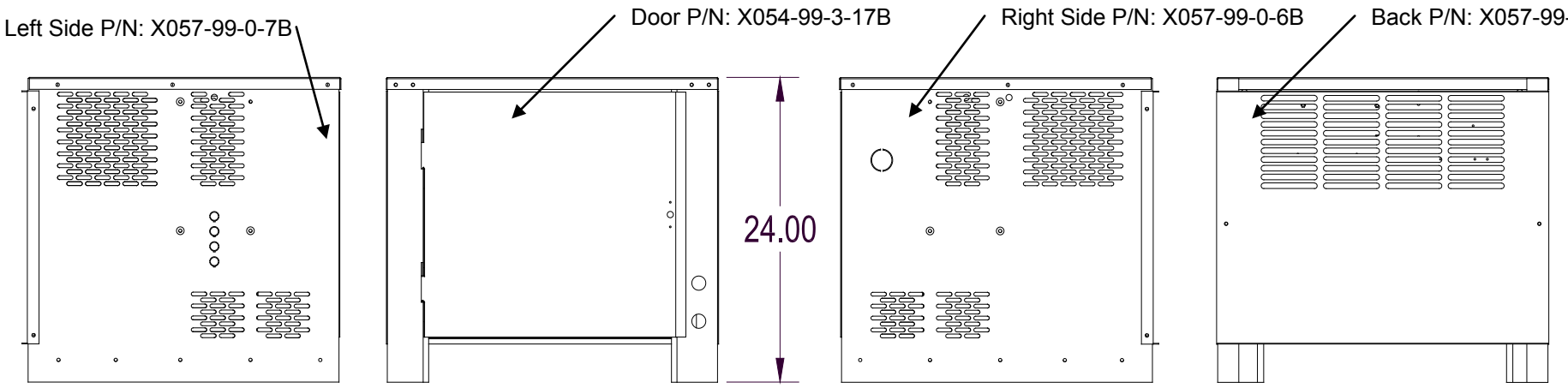
FLOOR MOUNTING DIMENSIONS



CABINET DIMENSIONS AND PARTS







MAINTENANCE LOG

1. Modifications to Factory Settings

Date	Variable	Change	Service Technician

2. Service

Date	Description	Service Technician

DOUGLAS BATTERY

1255 Creekshire Way, Suite 221, Winston-Salem, NC 27103
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www.douglasbattery.com

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